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INTERNATIONAL BUSINESS MACHINES CORPORATION 9000 SOUTH RITA ROAD TUCSON, AZ 85744			PANNALA, SATHYANARAYA R	
			ART UNIT	PAPER NUMBER
			2167	

DATE MAILED: 11/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

**Application No.**

10/055,431

**Applicant(s)**

KACZMARSKI ET AL.

**Examiner**

Sathyanarayan Pannala

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 January 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3,6-10 and 13-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3,6-10 and 13-17 is/are rejected.
- 7) ☒ Claim(s) 4,5,11 and 12 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 1/22/2002.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

1. The Application, 10/055431 and the Preliminary Amendment filed on 1/22/2002 have been examined. Claims 1-17 are pending in this Office Action.

#### ***Information Disclosure Statement***

2. The information disclosure statement (IDS) submitted with the application was filed is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement has been considered by the examiner.

#### ***Specification***

3. The abstract is objected because the abstract is a copy of the first paragraph of the summary. Corrected abstract of the disclosure is required and must be presented on a separate sheet, apart from any other text. Applicant is reminded of the proper content of an abstract of the disclosure.

A patent abstract is a concise statement of the technical disclosure of the patent and should include that which is new in the art to which the invention pertains. If the patent is of a basic nature, the entire technical disclosure may be new in the art, and the abstract should be directed to the entire disclosure. If the patent is in the nature of an improvement in an old apparatus, process, product, or composition, the abstract should include the technical disclosure of the

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improvement. In certain patents, particularly those for compounds and compositions, wherein the process for making and/or the use thereof are not obvious, the abstract should set forth a process for making and/or use thereof. If the new technical disclosure involves modifications or alternatives, the abstract should mention by way of example the preferred modification or alternative. The abstract should not refer to purported merits or speculative applications of the invention and should not compare the invention with the prior art.

### ***Claim Objections***

4. Claims 9-14 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The claim 9 is dependent on itself, which is an error and claims 10-14 are dependent on it.

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would

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have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1-3,6-10 and 13-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prahlad et al. (USPA Pub. 2004/0010487 A1) hereinafter Prahlad, and in view of Lewis et al. (USPA Pub. 2002/0083037 A1) hereinafter Lewis.

7. As per independent claim 1, Prahlad teaches a method for efficient creation, management and recovery of shadowed copies and quick recovery volumes of primary volumes or applications. The method further creates a quick recovery volume and snapshot images of the primary volumes and application data from a single interface. Prahlad teaches the claimed step of "after completing the creating operation, utilizing an application outboard of the designated host application to copy all items of source data and their associated locations to a secondary data object without regard to whether the items of source data have been updated since creating the copy-on-write relationship" as

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operating system to ensure that all data of the primary data set to be backed up is flushed to the archival storage unit or destination disk, where the quick recovery volume of the primary data set will be stored (Fig. 1, 4, page 5, paragraph 0048). Further, Prahlad teaches the claimed step of "copying a specified amount of contents of the original image cache to the secondary data object" as the data is copied after following several steps 502-505 (Fig. 1, 5, page 4, 6, paragraph 0039, 0054). Prahlad teaches copy-on-write technique in a limited way (page 6, paragraph 0055). However, Lewis teaches a method for creating a snapshot of a file system. The snapshot mechanism uses a copy-on-write technique as whenever a modification occurs, the modified data is copied to a new block and the old data is saved. In this way the snapshot only uses space where it differs from the active file system and the amount of work required to create the snapshot is minimum (see Lewis, paragraph Abstract). Lewis extensively teaches the claimed step of "creating a copy-on-write relationship between specified source data and an original image cache for updates from at least one designated host application, where responsive to at least a first update of each item of source data, an original image of said updated item of source data and its associated location are written to the original image cache" as the Write Anywhere File Layout (WAFL) file system uses a copy-on-write snapshot mechanism and snapshot block ownership in WAFL is recorded by updating the block's entry in a blockmap file, which is a bitmap indicating which blocks are in use and which are free for use. The invention is possible to be applied to any data storage system such as a database system or a store and forward system

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such as cache or RAM if the data is kept for a limited period of time (page 1-2, paragraph 0004 and 0015). Thus, it would have been obvious to one of ordinary skill in the data processing art at the time of the present invention, to combine the teachings of the cited references because the instant snapshot technique of Lewis' would have provided Prahlad's with the necessary facility, which would improve the snapshot technique by using copy-on-write method for more quickly and efficiently capturing contents of the files and directories in the file system at a particular point of time (see Lewis at page 1, paragraph 0008).

8. As per dependent claim 2, Lewis teaches the claimed step of "the specified amount comprises substantially all contents of the original image cache" as the file system uses the complete active file system as it was at the time of the snapshot was made and it is possible to apply this invention for store and forward systems such as cache or RAM if the data is kept for a limited period of time (page 1-2, paragraph 0010, 0015).

9. As per dependent claim 3, Prahlad teaches the claimed step of "between the utilizing and copying operations, terminating the copy-on-write relationship" as in logical snapshot the copy-on-write technique is used as space efficient copy where as in physical snapshot the will create a mirror or clone copy of application data or primary volumes (Fig. 5, page 6, paragraph 0055).

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10. As per dependent claim 6, Prahlad teaches the claimed step of "the operations further comprising RESTORE operations, comprising: copying all items of data copied by the utilizing operation from the secondary data object to their respective associated locations in a restore site, then copying all data copied by the copying operation from the secondary data object to the respective associated locations in the restore site overwriting any existing data in said associated locations" as the recovery method of Prahlad is extensively dealt in the disclosure and few statements will be explained as - for creating a quick recovery volume of a primary data set of client computer 400 is performed in several phases. The basic phases are snapshot phase 408 and a copy phase 414 (Fig. 3-4, page 4-5, paragraph 0046-0047).

11. As per dependent claim 7, Lewis teaches the claimed step of "the copying operation comprises, if an item of data being copied corresponds to a location of an item of data already existing on the secondary data object, overwriting the existing item of data in the secondary data object and operations further comprising RESTORE operations comprising copying data items of the secondary data object to their associated locations in a restore site" as at step 415, the file system 100 examines the snapmaps for (A) a snapshot just prior to the selected snapshot and (B) a snapshot just after the selected snapshot. For blocks that were in use by the selected snapshot the file system sets the associated bit to indicate the block is FREE (Fig. 4, page 5, paragraph 0085-86).



12. As per independent claim 8, which claims for a signal-bearing medium, Prahlad teaches a method for efficient creation, management and recovery of shadowed copies and quick recovery volumes of primary volumes or applications. The method further creates a quick recovery volume and snapshot images of the primary volumes and application data from a single interface. Prahlad teaches the claimed "after completing the creating operation, utilizing an application outboard of the designated host application to copy all items of source data and their associated locations to a secondary data object without regard to whether the items of source data have been updated since creating the copy-on-write relationship" as the quick recovery agent 108 synchronizes with the applications, if any and the operating system to ensure that all data of the primary data set to be backed up is flushed to the archival storage unit or destination disk, where the quick recovery volume of the primary data set will be stored (Fig. 1, 4, page 5, paragraph 0048). Further, Prahlad teaches the claimed "copying a specified amount of contents of the original image cache to the secondary data object" as the data is copied after following several steps 502-505 (Fig. 1, 5, page 4, 6, paragraph 0039, 0054). Prahlad teaches copy-on-write technique in a limited way (page 6, paragraph 0055). However, Lewis teaches a method for creating a snapshot of a file system. The snapshot mechanism uses a copy-on-write technique as whenever a modification occurs, the modified data is copied to a new block and the old data is saved. In this way the snapshot only uses space where it differs from the active file system and the amount of work required to create the snapshot is minimum (see Lewis,

paragraph Abstract). Lewis extensively teaches the claimed “creating a copy-on-write relationship between specified source data and an original image cache for updates from at least one designated host application, where responsive to at least a first update of each item of source data, an original image of said updated item of source data and its associated location are written to the original image cache” as the Write Anywhere File Layout (WAFL) file system uses a copy-on-write snapshot mechanism and snapshot block ownership in WAFL is recorded by updating the block’s entry in a blockmap file, which is a bitmap indicating which blocks are in use and which are free for use. The invention is possible to be applied to any data storage system such as a database system or a store and forward system such as cache or RAM if the data is kept for a limited period of time (page 1-2, paragraph 0004 and 0015). Thus, it would have been obvious to one of ordinary skill in the data processing art at the time of the present invention, to combine the teachings of the cited references because the instant snapshot technique of Lewis’ would have provided Prahlad’s with the necessary facility, which would improve the snapshot technique by using copy-on-write method for more quickly and efficiently capturing contents of the files and directories in the file system at a particular point of time (see Lewis at page 1, paragraph 0008).

13. As per dependent claim 9, Lewis teaches the claimed “the specified amount comprises substantially all contents of the original image cache” as the file system uses the complete active file system as it was at the time of the

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snapshot was made and it is possible to apply this invention for store and forward systems such as cache or RAM if the data is kept for a limited period of time (page 1-2, paragraph 0010, 0015).

14. As per dependent claim 10, Prahlad teaches the claimed "between the utilizing and copying operations, terminating the copy-on-write relationship" as in logical snapshot the copy-on-write technique is used as space efficient copy where as in physical snapshot the will create a mirror or clone copy of application data or primary volumes (Fig. 5, page 6, paragraph 0055).

15. As per dependent claim 13, Prahlad teaches the claimed "the operations further comprising RESTORE operations, comprising: copying all items of data copied by the utilizing operation from the secondary data object to their respective associated locations in a restore site, then copying all data copied by the copying operation from the secondary data object to the respective associated locations in the restore site overwriting any existing data in said associated locations" as the recovery method of Prahlad is extensively dealt in the disclosure and few statements will be explained as - for creating a quick recovery volume of a primary data set of client computer 400 is performed in several phases. The basic phases are snapshot phase 408 and a copy phase 414 (Fig. 3-4, page 4-5, paragraph 0046-0047).

16. As per dependent claim 14, Prahlad teaches the claimed “the copying operation comprises, if an item of data being copied corresponds to a location of an item of data already existing on the secondary data object, overwriting the existing item of data in the secondary data object and the operations further comprising RESTORE operations comprising copying data items of the secondary data object to their associated locations in a restore site” as at step 415, the file system 100 examines the snapmaps for (A) a snapshot just prior to the selected snapshot and (B) a snapshot just after the selected snapshot. For blocks that were in use by the selected snapshot the file system sets the associated bit to indicate the block is FREE (Fig. 4, page 5, paragraph 0085-86).

17. As per independent claim 15, which claims for a logic circuit. Prahlad teaches a method for efficient creation, management and recovery of shadowed copies and quick recovery volumes of primary volumes or applications. The method further creates a quick recovery volume and snapshot images of the primary volumes and application data from a single interface. Prahlad teaches the claimed “after completing the creating operation, utilizing an application outboard of the designated host application to copy all items of source data and their associated locations to a secondary data object without regard to whether the items of source data have been updated since creating the copy-on-write relationship” as the quick recovery agent 108 synchronizes with the applications, if any and the operating system to ensure that all data of the primary data set to be backed up is flushed to the archival storage unit or destination disk, where the

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quick recovery volume of the primary data set will be stored (Fig. 1, 4, page 5, paragraph 0048). Further, Prahlad teaches the claimed "copying a specified amount of contents of the original image cache to the secondary data object" as the data is copied after following several steps 502-505 (Fig. 1, 5, page 4, 6, paragraph 0039, 0054). Prahlad teaches copy-on-write technique in a limited way (page 6, paragraph 0055). However, Lewis teaches a method for creating a snapshot of a file system. The snapshot mechanism uses a copy-on-write technique as whenever a modification occurs, the modified data is copied to a new block and the old data is saved. In this way the snapshot only uses space where it differs from the active file system and the amount of work required to create the snapshot is minimum (see Lewis, paragraph Abstract). Lewis extensively teaches the claimed "creating a copy-on-write relationship between specified source data and an original image cache for updates from at least one designated host application, where responsive to at least a first update of each item of source data, an original image of said updated item of source data and its associated location are written to the original image cache" as the Write Anywhere File Layout (WAFL) file system uses a copy-on-write snapshot mechanism and snapshot block ownership in WAFL is recorded by updating the block's entry in a blockmap file, which is a bitmap indicating which blocks are in use and which are free for use. The invention is possible to be applied to any data storage system such as a database system or a store and forward system such as cache or RAM if the data is kept for a limited period of time (page 1-2, paragraph 0004 and 0015). Thus, it would have been obvious to one of ordinary

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skill in the data processing art at the time of the present invention, to combine the teachings of the cited references because the instant snapshot technique of Lewis' would have provided Prahlad's with the necessary facility, which would improve the snapshot technique by using copy-on-write method for more quickly and efficiently capturing contents of the files and directories in the file system at a particular point of time (see Lewis at page 1, paragraph 0008).

18. As per independent claim 16, which claims for a system. Prahlad teaches a method for efficient creation, management and recovery of shadowed copies and quick recovery volumes of primary volumes or applications. The method further creates a quick recovery volume and snapshot images of the primary volumes and application data from a single interface. Prahlad teaches the claimed "a primary storage" as during the copy phase 414, the quick recovery agent 108 performs a block-level copy of the primary data to the destination disk or volume (page 5, paragraph 0051). Further, Prahlad teaches the claimed "a secondary storage" as data mover perform server-less data transfer using extended copy to create secondary or auxiliary copies over communication network (page 6, paragraph 0056). Further, Prahlad teaches the claimed "a computing machine" as a client computer (Fig. 4, page 5, paragraph 0047). Further, Prahlad teaches the claimed "an interface coupling the server to the primary and secondary storage" as SAN or LAN (page 6, paragraph 0056). Further, Prahlad teaches the claimed "after completing the creating operation, utilizing an application outboard of the designated host application to copy all

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items of source data and their associated locations to a secondary data object without regard to whether the items of source data have been updated since creating the copy-on-write relationship” as the quick recovery agent 108 synchronizes with the applications, if any and the operating system to ensure that all data of the primary data set to be backed up is flushed to the archival storage unit or destination disk, where the quick recovery volume of the primary data set will be stored (Fig. 1, 4, page 5, paragraph 0048). Further, Prahlad teaches the claimed “copying a specified amount of the original image cache to the secondary data object” as the data is copied after following several steps 502-505 (Fig. 1, 5, page 4, 6, paragraph 0039, 0054). Prahlad teaches copy-on-write technique in a limited way (page 6, paragraph 0055). However, Lewis teaches a method for creating a snapshot of a file system. The snapshot mechanism uses a copy-on-write technique as whenever a modification occurs, the modified data is copied to a new block and the old data is saved. In this way the snapshot only uses space where it differs from the active file system and the amount of work required to create the snapshot is minimum (see Lewis, paragraph Abstract). Lewis extensively teaches the claimed “creating a copy-on-write relationship between specified source data in the primary storage and an original image cache for updates from at least one designated host application, where responsive to at least a first update of each item of source data, an original image of said updated item of source data and its associated location are written to the original image cache” as the Write Anywhere File Layout (WAFL) file system uses a copy-on-write snapshot mechanism and snapshot block

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ownership in WAFL is recorded by updating the block's entry in a blockmap file, which is a bitmap indicating which blocks are in use and which are free for use.

The invention is possible to be applied to any data storage system such as a database system or a store and forward system such as cache or RAM if the data is kept for a limited period of time (page 1-2, paragraph 0004 and 0015).

Thus, it would have been obvious to one of ordinary skill in the data processing art at the time of the present invention, to combine the teachings of the cited references because the instant snapshot technique of Lewis' would have provided Prahlad's with the necessary facility, which would improve the snapshot technique by using copy-on-write method for more quickly and efficiently capturing contents of the files and directories in the file system at a particular point of time (see Lewis at page 1, paragraph 0008).

19. As per independent claim 17, which claims for a system. Prahlad teaches a method for efficient creation, management and recovery of shadowed copies and quick recovery volumes of primary volumes or applications. The method further creates a quick recovery volume and snapshot images of the primary volumes and application data from a single interface. Prahlad teaches the claimed "primary means for storing data" as during the copy phase 414, the quick recovery agent 108 performs a block-level copy of the primary data to the destination disk or volume (page 5, paragraph 0051). Further, Prahlad teaches the claimed "secondary means for storing data" as data mover perform server-less data transfer using extended copy to create secondary or auxiliary copies



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over communication network (page 6, paragraph 0056). Further, Prahlad teaches the claimed "an interface coupled to the first and second means" as SAN or LAN (page 6, paragraph 0056). Further, Prahlad teaches the claimed "after completing the creating operation, utilizing an application outboard of the designated host application to copy all items of source data and their associated locations to a secondary data object in the second means without regard to whether the items of source data have been updated since creating the copy-on-write relationship" as the quick recovery agent 108 synchronizes with the applications, if any and the operating system to ensure that all data of the primary data set to be backed up is flushed to the archival storage unit or destination disk, where the quick recovery volume of the primary data set will be stored (Fig. 1, 4, page 5, paragraph 0048). Further, Prahlad teaches the claimed "copying a specified amount of the original image cache means to the secondary data object" as the data is copied after following several steps 502-505 (Fig. 1, 5, page 4, 6, paragraph 0039, 0054). Prahlad teaches copy-on-write technique in a limited way (page 6, paragraph 0055). However, Lewis teaches a method for creating a snapshot of a file system. The snapshot mechanism uses a copy-on-write technique as whenever a modification occurs, the modified data is copied to a new block and the old data is saved. In this way the snapshot only uses space where it differs from the active file system and the amount of work required to create the snapshot is minimum (see Lewis, paragraph Abstract). Lewis extensively teaches the claimed "creating a copy-on-write relationship between specified source data in the primary means and the original image

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cache means for updates from at least one designated host application, where responsive to at least a first update of each item of source data, an original image of said updated item of source data and its associated location are written to the original image cache means” as the Write Anywhere File Layout (WAFL) file system uses a copy-on-write snapshot mechanism and snapshot block ownership in WAFL is recorded by updating the block’s entry in a blockmap file, which is a bitmap indicating which blocks are in use and which are free for use. The invention is possible to be applied to any data storage system such as a database system or a store and forward system such as cache or RAM if the data is kept for a limited period of time (page 1-2, paragraph 0004 and 0015). Thus, it would have been obvious to one of ordinary skill in the data processing art at the time of the present invention, to combine the teachings of the cited references because the instant snapshot technique of Lewis’ would have provided Prahlad’s with the necessary facility, which would improve the snapshot technique by using copy-on-write method for more quickly and efficiently capturing contents of the files and directories in the file system at a particular point of time (see Lewis at page 1, paragraph 0008). Finally, Lewis also teaches “original image cache means for storing data” as to store and forward system such as cache or RAM if the data is kept for a limited period of time (Page 2; paragraph 0015).

***Allowable Subject Matter***

20. Claims 4-5 and 11-12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.


***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sathyanarayan Pannala whose telephone number is (571) 272-4115. The examiner can normally be reached on 8:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Breene can be reached on (571) 272-4107. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Sathyanarayan Pannala  
Examiner  
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srp  
October 29, 2004